

REMARKS

Reconsideration of this application as amended is respectfully requested.

In the Office Action dated March 20, 2008, claims 1-20 are pending. Claims 1-20 stand rejected. In this response, claims 1, 2, 8-15 and 20 have been amended. No new claims have been added. No claims have been canceled. Thus, claims 1-20, as amended, remain pending. Support for the amendments can be found throughout the specifications as filed. No new matter has been added. Applicants reserve all rights with respect to the applicability of the Doctrine of Equivalents.

Objections

Objections to the Claims

Claims 8-14

Claims 8-14 are objected to because of informalities. Accordingly, claims 8-14 have been amended. In view of the foregoing amendments, applicants respectfully submit that the informalities have been corrected. Withdrawal of the objection is respectfully requested.

Rejections

Double Patenting Rejection

Claims 1-20

Claims 1-20 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over parent application 10/779,193 in view of Mulder, "inter: An inexpensive inter-procedure register allocator" Micro processing and microprogramming, Elsevier Science Publishers, Vol. 27, 1998, pages 95-100 (hereinafter "Mulder"). In view of the foregoing amendments, it is respectfully submitted that the double patenting rejection has been overcome.

Rejections under 35 U.S.C. § 101

Claims 8-14

Claims 8-14 stand rejected under 35 U.S.C. §101 as the claimed invention is allegedly directed to non-statutory subject matter. In response, claims 8-14 have been amended. In view of the foregoing amendments, applicants respectfully submit that claims 8-14, as amended, are directed to statutory subject matter in compliance with the requirements of 35 U.S.C. §101. Accordingly, applicants respectfully request withdrawal of the 35 U.S.C. § 101 rejection.

Rejections under 35 U.S.C. § 112, second paragraph

Claims 1-20

Claims 1-20 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for allegedly failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. Claims 1-20 have been amended. However, applicants respectively traverse the rejection for at least the reasons set forth below.

In regards to claims 1 and 8, the Office Action alleges that the claim limitations recited as a current thread, a most bottom order and the determination of resources allocated to one or more child threads are indefinite. In response, applicants respectfully direct the Examiner's attention to at least paragraphs [0086], [0089], [0090] and Figures 10, 11 and 13 of the Application as originally filed, in which these claim limitations are clearly disclosed for a person of ordinary skill in the art at the time the invention was made.

In regards to claim 15, the Office Action alleges that the claim limitations recited as a processor to select, determine and allocate are indefinite. In response, applicants respectfully direct the Examiner's attention to at least paragraphs [0026]-[0033], [0083]-[0090] and Figures 1, 11-13 of the Application as originally filed, in which these claim limitations are clearly disclosed for a person of ordinary skill in the art at the time the invention was made for a person of ordinary skill in the art at the time the invention was made.

In regards to claims 4, 11 and 16, the Office Action alleges that the claim limitations recited as updating resource information allocated to the current thread are indefinite. In response, applicants respectfully direct the Examiner's attention to at least paragraph [0090] and Figures 12-13 of the Application as originally filed, in which these claim limitations are clearly disclosed for a person of ordinary skill in the art at the time the invention was made.

In regards to claims 5, 12 and 17, the Office Action alleges that the claim limitations recited as allocating in a bottom up order are indefinite. In response, applicants respectfully direct the Examiner's attention to at least paragraph [0084] and Figure 10 of the Application as originally filed, in which these claim limitations are clearly disclosed for a person of ordinary skill in the art at the time the invention was made.

In regards to claims 7, 14 and 19, the Office Action alleges that the claim limitations recited as determining whether there are resources remaining and deleting at least one child of the current thread are indefinite. In response, applicants respectfully direct the Examiner's attention to at least paragraphs [0087], [0090] and Figure 13 of the Application as originally filed, in which these claim limitations are clearly disclosed for a person of ordinary skill in the art at the time the invention was made.

In view of the foregoing, applicants respectfully submit that claims 1-20, as amended, are in compliance with the requirements of 35 U.S.C. §112, second paragraph. Withdrawal of the 35 U.S.C. §112 rejection is respectfully requested.

Rejections under 35 U.S.C. § 103(a)

Claims 1-6, 8-13, 15-18 and 20

Claims 1-6, 8-13, 15-18 and 20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Mulder. Claims 1, 2, 8-13, 15 and 20 have been amended. However, applicants respectfully submit that applicants' claims 1-6, 8-13, 15-18 and 20, as amended, are patentable over the cited reference.

Specifically, for example, independent claim 1, as amended, includes the limitations:

“generating, during a compilation of a code having a main thread, one or more threads executable in a data processing system, each of the one or more threads including instructions copied from the main thread, the one or more threads being associated with a thread dependency graph;
selecting a current thread from the one and more threads based on a bottom-up order according to the thread dependency graph;
determining resources allocated to one or more child threads spawned from the current thread based on the instructions copied from the main thread, wherein the resources include shareable resources between the current thread and the one or more child threads; and
allocating resources for the current thread in consideration of the resources allocated to the current thread's one or more child threads to avoid resource conflicts between the current thread and its one or more child

threads, wherein the allocation shares the sharable resources between the current thread and the one or more child threads”
(emphasis added)

Applicants respectfully submit that Mulder fails to teach or suggest the limitations of determining shareable resources between a current thread and a child thread based on instructions from a main thread for resource allocation.

Rather, Mulder teaches an interprocedural allocation process to assign variables to registers (Mulder, 6). According to Mulder, the essence of the allocation process is to propagate register usage of procedures to their callers (Mulder, 6.1). Mulder describes passing a register usage information from a callee to a caller traversing a call-graph (Mulder, 6). Mulder also discusses the register usage information from callees are combined in a set based on a register mask (Mulder, 6.1, Fig. 10). Clearly, when a register in Mulder is marked allocated to a process via the register mask, it is no longer available for another process to share. However, Mulder fails to disclose or suggest determining shareable resources between a current thread and a child thread based on instructions from a main thread for resource allocation.

In order to render a claim obvious, each and every limitation of the claim must be taught by the cited references. Therefore, in view of the foregoing remarks, it is respectfully submitted that claim 1, as amended, is patentable over Mulder.

Independent claims 8 and 15, as amended, include similar limitations of claim 1, as amended. Therefore, for at least the similar reasons as discussed above, applicants respectfully submit that claims 8 and 15, as amended, are patentable over Mulder.

Given that claims 2-6, 9-13, 16-18 and 20 depend from and include the limitations of one of independent claims 1, 8 and 15, as amended, it is respectfully submitted that claims 2-6, 9-13 16-18 and 20, as amended, are patentable over the cited reference.

Claims 7, 14 and 19

Claims 7, 14 and 19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Mulder in view of US Patent No. 7,036,124 to Patterson (hereinafter “Patterson”). Applicants hereby reserve the right to swear behind Patterson at a later date. However, applicants

respectfully submit that applicants' claims 7, 14 and 19, as amended, are patentable over the cited references.

Claims 7, 14 and 19, as amended, depend from one of independent claims 1, 8 and 15, as amended, and inherit the above noted claim limitations related to determining shareable resources between a current thread and a child thread based on instructions from a main thread for resource allocation. It is respectfully submitted that Mulder, for similar reasons as discussed above, or Patterson, individually or in combination, fail to disclose or suggest the noted limitations.

Rather, Patterson provides a resource management for controlling allocation of a resource to competing computer processes through the use of a joining function (Patterson, Abstract). According to Patterson, a joining function is operable to notify a resource manager on termination of a thread for a process to allocate the resource to another process (Patterson, Abstract). Thus, Patterson teaches allocating resources between processes when threads are terminated. However, Patterson does not teach or suggest determining shareable resources between a current thread and a child thread based on instructions from a main thread for resource allocation.

The Office Action notes that "Pat[t]erson teaches deleting at least one child thread of the current thread (abs., lines 8-10). It appears that the Office Action asserting notifying a resource manager on termination of a thread to allocate resource (Patterson, Abstract, lines 8-10) teaches deleting at least one child thread of the current thread. Applicants respectfully disagree. Here, Patterson simply discloses a notification on termination of a thread. As is well known in the art, deleting a thread may result in termination of the thread. However, termination of a thread may not be caused by the thread being deleted. For example, a thread may exit normally when terminated. As such, applicants respectfully submit that Patterson fails to teach or suggest deleting at least one child thread of the current thread.

Furthermore, Patterson is related to a high level thread management such as a user thread or OS thread management. Mudler, on the other hand, relates to register allocation at a processor level during executing machine code instructions. Thus, Mudler is related to processor design while Patterson is related to high level programming which has nothing to do with how a processor is designed. Mudler and Patterson are in significantly different fields in

view of one with ordinary skill in the computer related art. Therefore, one with ordinary skill in the computer related art would not, based on the disclosure of Mudler and Patterson, to combine these two references.

Even if Mudler and Patterson were combined, such a combination still lacks the limitations set forth above. Therefore, for at least the reasons set forth above, it is respectfully submitted that claims 7, 14 and 19, as amended, are patentable over the cited references.

CONCLUSION

In view of the foregoing, applicants respectfully submit that all applicable rejections and objections have been overcome.

Please charge Deposit Account No. 02-2666 for any shortage of fees in connection with this response. Further, if an extension is required, then applicants hereby request such extension.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

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